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REPORT

on the

BURNEY BEETLE CONTROL PROJECT

Shasta County, California

1946

By

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Forest Technician

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I- INTRODUCTION.

In the early months of 1945 an insect control program was carried on in the Hat Creek, Burney Flat, Goose Valley and Clark Creek areas of Shasta County for the purpose of combating a beetle infestation which had reached epidemic proportions. The insects involved were Dendroctonus brevicomis, Ips confusus and Ips oregoni. Control operations were carried out on approximately 11,000 acres, and 1,429 trees and 2,168 poles were treated.

During the fall months a check on the effectiveness of this effort was made by the Bureau of Entomology assisted by the Division of Forestry. It was found that on the area as a whole the loss in volume had been reduced from 205 feet per acre to 53 feet, and the number of infected trees had been reduced from .37 to .05 per acre.

In December a meeting of members of the Bureau of Entomology and the Division of Forestry was held in Berkeley, at which time it was recommended that a follow up and maintenance program be adopted for the following

units in the Hat Creek and Burney Flat areas:

1. Haynes, Black and Doyle ranches.

2. A protection zone of 2,740 acres surrounding Burney Falls State Park, owned by the Fruit Growers Supply Company, Pacific Gas and Electric Company and U.S. Forest Service.

3. Smith and Wilcox ranches, which were not treated last year, but upon which a new infestation had appeared.

Later it was decided to extend the program to include the following:

1. 750 acres north of Lake Britton belonging to the Pacific Gas and Electric Company.

2. 200 acres north of Lake Britton belonging to the Indian Service.

3. 6,500 acres in Burney Flat belonging to the Fruit Growers Supply Company.

In January, 1946 the State Forester set up a fund of $7,000 to be used on the above project, with the stipulation that for the area as a whole any expenditures by the State would be matched by the land owners in aggregate.

II- AGREEMENTS.

Pursuant to the foregoing decisions, agreements were entered into with the various land owners. These agreements are listed in Table I. In this table, as in others, the letters F.G.S.C. refer to the Fruit Growers Supply Company and P.G.&E. to the Pacific Gas & Electric Company.

TABLE I
AGREEMENTS

CO-OPERATOR	ACREAGE INVOLVED	CO-OPERATORS CONTRIBUTION	STATE CONTRIBUTION
F.G.S.C.	8,440.00	$3,500.00	$2,500.00
P.G.& E.	1,320.00	250.00	250.00
BLACK	80.00	90.00	90.00
DOYLE	160.00	37.00	37.00
HAYNES	200.00	153.50	153.50
SMITH	80.00	90.00	90.00
WILCOX	200.00	90.00	90.00
TOTALS	10,480.00	$4,210.50	$3,210.50

The type of control agreed upon for the various units was as follows:

1. F.G.S.C. - Park Maintenance Zone -1,040 acres salvage.- Sanitation salvage.

2. F.G.S.C. - T36NR3E - 4,240 acres - Direct.

3. F.G.S.C. - T35NR3E - 3,160 acres - Sanitation-salvage.

4. P.G. &E. - Park Maintenance Zone - 1,320 acres-Direct.

5. Ranchers - All 720 acres - Direct.

Of the above, areas 1, 2 and 5 were treated in the 1945 program, except the Smith and Wilcox ranches. Areas 3 and 4 had not been treated previous to this year.

The understanding with the Fruit Growers Supply Company was that they would match State expenditures up to $2,500, and in addition would furnish two men for marking high risk trees to the extent of $1,000. No agreement was obtained from the Indian Service and therefore no work was done on that unit.

Logging of the salvaged trees was done by the Burney Lumber Company under an agreement with the Fruit Growers

Supply Company in which the State had no part.

III- SPOTTING.

Spotting was started on January 28, 1946 with a four man crew, which was reduced, after a few days, to three men. This crew worked on the salvage and sanitation cutting areas, with a few interruptions, until March 14. On March 4 another three man crew was added, for spotting on the direct control areas, which continued to March 14, also. With the exception of three days spent on P.G.&E. land, all spotting was done on F.G.S.C. land. No spotting was done on the ranches, as the insect trees were usually grouped, the area was small, and the foreman of the crew was able to make the proper selection.

A-Spotting for Salvage

Various methods were tried for the salvage control area, but the one described as follows proved to be the most practical and was used after the first week. The compass man was furnished by the C.D.F. and the two spotters by F.G.S.C. Conventional 10 chain strips were run, and trees selected for cutting were marked with bands of paint, two bands for bug trees and one for others. The paint was applied with guns. Belt axes were used for testing bug trees, which were blazed and tagged with a serial number. The tag was a plain piece of scratch pad paper, 3x5 inches, with the number marked with grease

pencil. The number was also marked on the blaze. Each spotter kept a record of diameters of trees selected by him. The compass man made a map and plotted the bug trees only on a "treating plat", supplied the spotters with numbers for the bug trees, and kept a "spotting record" of bug trees only. Trees selected for treating were those with broods of insects in the base or with 50% or more of the top killed and a current fade. High risk trees marked for cutting were those which showed definite signs of decadence, such as short needles, thin foliage, spike top, short crown, etc. The stand in this area was composed mostly of over-mature trees, 250 to 300 years old, about 8 to 10 thousand feet per acre. An endeavor was made to mark 1,000 feet per acre in order to make logging profitable. At the same time the owner wished to hold cutting to a minimum, since the timber was sold at cost. In the salvage control area 1,040 acres were spotted, 648 trees marked for cutting which produced 911,970 ft. by log scale, or 877 ft. per acre. There were 10 poles and 75 trees containing 77,350 ft. which were infested with insect broods, or 74 ft. per acre.

B. Spotting for Direct Control.

Spotting on the direct control area followed the conventional method, that is, a three man crew running 10 chain strips, and of course marking infested trees only. Trees were marked with ax blazes, and tagged, numbered and platted as described above. The direct control area was composed of two units:

1-Fruit Growers Supply Company land in T36NR3E.

This unit was treated in 1945 and the infestation was therefore comparatively light. 4,240 acres were spotted and 19 poles and 116 trees marked for treating, containing 116,630 feet, or 27 feet per acre.

2-P.G. & E. land in the Park Maintenance Zone.

This unit contained approximately 1,320 acres and although it was not treated last year it was found that there was no infestation except in a small area of about 160 acres north of Lake Britton and west of Clark Creek. These 160 acres were covered by formal spotting but the remainder of the unit was covered by high point and road spotting. Two poles and 11 trees containing 6,210 feet were marked for treating on 160 acres, or 40 feet per acre.

C-Spotting for Sanitation - Salvage.

This area belongs to F.G.S.C. and lies in T35NR3E. The spotting method was the same as for the salvage control area except that since no treating was to be done, the bug trees were not blazed or tagged and were not platted on the map. However, a separate record of the bug trees was kept. On the 3,160 acres covered in this area 2,211 trees containing 3,234,380 feet were marked for cutting, of which 409 trees with 375,800 feet were bug trees (119 Ft. per acre).

D-Spotting Performance.

A total of 103 man days were spent in spotting 9,760 acres at a cost of $1,921.59. For direct control the spotting average was 159 acres per man day at a cost of 12¢ per acre. For salvage control the average was 62 acres per man day at a cost of 29¢ per acre. A complete record of spot-

ting is found in Tables II, III and IV.

TABLE II

ACRES SPOTTED & TREATED BY OWNERSHIP

Owner	Control	Spotted	Treated
*P.G.&E.	Direct	1,320	160
*F.G.S.C.	Salvage	1,040	680
"	Direct	4,240	2,560
"	Sanit.-Salvage	3,160	000
Ranches	Direct	000	720
	Total	9,760	4,120

*Park Maintenance Zone

TABLE III

SPOTTING PERFORMANCE & COSTS*

	Acres Spotted	Man Days	Aver. Per Man Day	Cost per Man Day	Total Cost	Cost per Acre
Direct Control	5,560	35	158.9	$19.53	$ 683.55	$.123
Salvage	4,200	68	61.7	19.53	1,238.04	
Total	9,760	103	117.6		$1,921.59	$.199

*Includes operational expense.

TABLE IV.

TIMBER SALVAGED (F.G.S.C.)

Location	Trees	Volume
Park Zone, includes treated trees	648	903,930*
T35N3E, Sani.-Sal. Area, High risk	1,802	2,858,580
" " " " Infested	409	375,800
Total	2,859	4,138,310

*Logs were scaled at 911,970.

IV- TREATING

Camp was set up for the treating crews in the C.D.F. suppression camp at Burney. It had been planned to start treating on February 4, but heavy snows forced a delay of one week. On February 11 a crew of seven C.Y.A. boys and three C.D.F. foremen

and the cook arrived at camp and treating commenced. One C.Y.A. boy was assigned as cook's helper and two were assigned to each of the three foremen, making three treating crews of three men each. Treating continued until March 19. Two methods of treating were followed, one usually used for Ips infested trees and the other usually used for the larger trees infested with Dendroctonus.

A-Ips Trees:

These trees were treated by piling and burning the entire tree. In as much as burning conditions were poor, and the trees green, some additional fuel had to be found to insure a complete burn. It was found that old tires answered this purpose quite successfully. One or two tires were placed on the bottom of the pile, several logs laid around them, then the brush piled on top. The tires provided a hot fire which kept the green brush burning. The trunks of the trees were cut into short lengths and thrown on top of the burning pile.

B-Dendroctonus Trees.

These trees were usually treated by the "peel-burn" method, i.e., the bark was peeled from the trunk, stacked beneath it and fired. The slash was piled on the top end of the burning trunk. A satisfactory treatment was obtained this way.

C-Performance.

Treating was carried on over an area of 4,120 acres. 234 man days were spent in treating 662 poles and 267 trees containing 229,190 feet. The average per man day was 13.9 poles and 1,143 feet at a cost of $1.06 per pole and $12.84 per thousand feet. Tables II, IV, V, VI, VII and VIII contain the complete figures on treating.

TABLE V.

TREATING RECORD

Owner	Control	Location	Trees	Poles	Volume*
P.G.& E.		Park Zone	11	2	6,210
F.G.S.C.	Salvage	Park Zone	75	10	77,350
F.G.S.C.	Direct	T36N3E	116	19	116,630
Haynes	"	T35N2E	32	57	15,400
Black	"	T36N3E	2	4	360
Doyle	"	T35N4E	6	1	8,040
Smith	"	T33N4E	9	16	2,800
Wilcox	"	T33N5E	16	553	2,400
		Total	267	662	229,190

*Trees only - volume of poles not computed.

TABLE VI.

SAMPLE TREATING PERFORMANCE

	Man Days	Total Volume	Average Volume Per Man Day	Number of Trees	Average No. Per Man Day
Poles	21			291	13.9
Trees	85	97,190	1,143	92	1.08 one tree per day.

TABLE VII.

TREATING COSTS*

Average Per Man Day	Cost Per Man Day	Unit Cost
13.9 Poles	$14.68	$ 1.06 per pole
1.08 Trees	14.68	13.59 per tree
1,143 FT.B.M.	14.68	12.84 per M.Ft.BM

*Includes operational Expense

TABLE VIII.

PARK MAINTENANCE ZONE
(Not including stumpage)

	P.G. & E.		F.G.S.C.		TOTAL	
Acres Spotted	1,320	$ 58.59	1,040	$305.76	2,360	$ 364.35
Acres Treated	160		680		840	
Poles "	2		10		12	
Trees "	11		75		86	
Volume "	6,210	179.18	77,350	993.17	83,560	1,172.35
Trees Salvaged			648			
Volume "			903,930			
		$237.77		$1,298.93		$1,536.70

COSTS.

A total of 480 man days, including operational labor, was spent on the project at a cost of $2,964.40 for labor. These figures do not include two spotters contributed by the Fruit Growers Supply Company. The operating expense in addition to labor was $1,836.21, including $665.51 for equipment. The above figures are broken down in Tables IX and X.

TABLE IX

LABOR COST & DISTRIBUTION
STATE EXPENDITURE ONLY

		C. D. F.			C. Y. A.			TOTAL
		Man Days	Rate*	Cost	Man Days	Rate	Cost	
	Administrative	41	$10.20	$418.20				$418.20
	Kitchen	32	7.40	236.80	32	$3.00	$96.00	332.80
	Maintenance**	41	8.60	352.60	30	3.00	90.00	442.60
	Total Operational	114		$1,007.60	62		$186.00	$1,193.60
Spotting	F.G.S.C.	67	9.56	640.52				640.52
	P.G. & E.	3	9.56	28.68				28.68
Treating	F.G.S.C.	43	8.40	361.20	100	3.00	300.00	661.20
	P.G. & E.	4	8.40	33.60	8	3.00	24.00	57.60
	Haynes	8	8.40	67.20	16	3.00	48.00	115.20
	Black	1	8.40	8.40	2	3.00	6.00	14.40
	Wilcox	13	8.40	109.20	26	3.00	78.00	187.20
	Smith	4	8.40	33.60	6	3.00	18.00	51.60
	Doyle	1	8.40	8.40	2	3.00	6.00	14.40
	Total Direct	144		$1,290.80	160		$480.00	$1,770.80
Total	Operational***	114		1,007.60	62		186.00	1,193.60
Total	Direct	144		1,290.80	160		480.00	1,770.80
Grand	Total	258		$2,298.40	222		$666.00	$2,964.40

* C.D.F. wage rates are based on average of salaries computed on a 25 day month.

** Includes camp maintenance, saw filing and loss of time a/c weather.

*** Direct labor is that actually used in treating or spotting.
Operational is all other types of labor

TABLE X.

DISTRIBUTION OF OPERATING EXPENSE

Subsistence	$ 767.58
Auto Service	37.64
Gas & Oil	103.79
Telephone	6.40
Light	18.50
Water	9.00
Rent	125.00
Travel	26.03
Fuel Oil	74.25
Miscellaneous	668.02*
Total Overhead	$1,836.21

*Includes $665.51 for P. & E. (Power Saw)

The total State expenditure of $4,800.61 is distributed as shown in Table XI. From this amount should be deducted $1,815.03 which will be paid to the State by cooperators, leaving a net cost to the State of $2,985.58, as shown in Table XII.

TABLE XI.

TOTAL STATE EXPENDITURE
OPERATIONAL EXPENSE DISTRIBUTED IN PROPORTION
TO DIRECT LABOR

	Spotting		CDF Treating		CYA Treating		Oper. Ex.		Total
Owners	Man Days	@$9.56	Man Days	@$8.40	Man Days	@$3.00	%	Amt.	
P.G.S.C.	67	640.52	43	361.20	100	300.00	69.0	2,090.57	3,392.29
P.G. & E.	3	28.68	4	33.60	8	24.00	5.0	151.49	237.77
Haynes			8	67.20	16	48.00	8.0	242.38	357.58
Black			1	8.40	2	6.00	.9	27.27	41.67
Wilcox			13	109.20	26	78.00	12.8	387.82	575.02
Smith			4	33.60	6	18.00	3.3	99.98	151.58
Doyle			1	8.40	2	6.00	1.0	30.30	44.70
	70	$669.20	74	$621.60	160	$480.00	%100.	$3,029.81	$4,800.61

STATEMENTS TO COOPERATORS

To: Fruit Growers Supply Company.

67 man days of spotting, CDF labor @ $9.56 ...	$ 640.52
43 man days of treating, CDF labor @ 8.40 ...	361.20
100 man days of treating, CYA labor @ 3.00 ...	300.00
69% of operating expense ($3,029.81)	2,090.57
	$3,392.29
Less State's share (50%)	1,696.14
Due to State	$1,696.15

To: Pacific Gas & Electric Company

3 days of spotting, CDF labor @ $9.56	$ 28.68
4 days of treating, CDF labor @ 8.40	33.60
8 days of treating, CYA labor @ 3.00	24.00
5% of operating expense ($3,029.81)	151.49
	$ 237.77
Less State's share (50%)	118.89
Due to State	$ 118.88

TABLE XII.

NET COST TO STATE

Labor Cost (Table I.)		$ 2,964.40
Operating Expense (Table II.)		1,836.21
Total (Table III.)		$ 4,800.61
Billed to F.G.S.C.	$1,696.15	
Billed to P.G.& E.	118.88	
	$1,815.03	1,815.03
Net Cost to State		$ 2,985.58

The above figures include CDF labor, and since this is not chargeable against the Insect Control Fund, Table XIII has been prepared which shows that $2,502.21 has been used from this fund. Cooperators contributions are listed in Table XIV, and a comparison of State and cooperators contributions made in Table XV. The latter shows that the land owners contributed $2,987.52 in stumpage, labor and cash, as against the

State's $2,985.58, a total of $5,973.10 for the project.

TABLE XIII.

INSECT CONTROL FUND

Allotted			$7,000.00
Disbursed:			
	Operating Expense	$1,836.21	
	CYA Labor	666.00	
		$2,502.21	2,502.21
Balance			$4,497.79

TABLE XIV.

COOPERATORS' CONTRIBUTIONS

Owner	Trees M Ft	Trees @ $5.	Poles No.	Poles @ $.62	Cash or Labor	Total Value
F.G.S.C.-Labor*					396.00	396.00
F.G.S.C.			29	17.98	1,696.15**	1,714.13
P.G.&E.	6.21	31.05	2	1.24	118.88**	151.17
Haynes	15.4	77.00	57	35.34	120.00	232.34
Black	.36	1.80	4	2.48		4.28
Doyle	8.04	40.20	1	.62		40.82
Smith	2.8	14.00	16	9.92	30.00	53.92
Wilcox	2.4	12.00	553	342.86	40.00	394.86
	35.21	176.05	662	410.44	2,401.03	2,987.52

*53 Man Days Spotting @ $12.00

** Cash

TABLE XV.

TOTAL COOPERATOR & STATE CONTRIBUTIONS

	COOPERATOR	STATE	TOTAL
F.G.S.C.	$ 2,110.13	$ 1,696.14	$ 3,806.27
P.G.& E.	151.17	118.89	270.06
Black	4.28	41.67	45.95
Doyle	40.82	44.70	85.52
Haynes	232.34	357.58	589.92
Smith	53.92	151.58	205.50
Wilcox	394.86	575.02	969.88
	$ 2,987.52	$ 2,985.58	$ 5,973.10

TABLE XVI.

MEAL COST

Total Meals Served - 1,577

	Expense	Cost Per Meal
Food	$ 767.58	$ .487
Labor (Cook & Helper).	332.80	.211
Total.	$1,100.38	$ .698

TABLE XVII.

MEALS SERVED CYA PERSONNEL

	Number	Unit Cost	Total
Boys	825	$ .698	$575.85
Supervisor	38	.698	26.52
CYA Visitors	14	.698	9.72
Total	877		$612.09

TABLE XVIII.

ESTIMATED & ACTUAL COSTS
(Not including stumpage)

	Estimated	Actual
F.G.S.C. Park Zone	$ 335.00	$1,298.93
F.G.S.C. Other Areas	1,850.00	3,788.29
P.G.& E. Park Zone	750.00	237.77
Ranches	500.00	1,360.55
Total	$3,435.00	$6,685.54

VI- FOREST SERVICE

It should be noted here that the United States Forest Service has also carried on a control program on Forest land in the Burney Park Maintenance Zone and in townships 35, 36 and 37N, R3E. The Forest Service expenditures, amounting to approximately $1,500.00 has not been included in the tables referring to owner contribution, as the latter already exceeds that of the State. However, it would be permissable to credit this amount to cooperators' contribution, if necessary, to match the State contribution. The Forest Service work rounds out the control program in this area, as there is only a small amount of land in ownership other than that mentioned. It is to be hoped that the Indian Service will see fit to remove the few groups of Ips infested trees on their land.

VII- PROJECT APPRAISAL

The purpose of this control effort was to provide protection against insect damage to Burney Falls State Park, and to protect the investment which was made by the 1945 program. It is felt that this purpose has been accomplished, and in addition protection has been provided for the southern Burney Flat and Hat Creek Districts. There might be some question as to whether the direct control treatment on F.G.S.C. land was justified, considering the small amount of infestation. But since the owner desired the work done, and the treatment has certainly reduced the hazard of later insect attacks, it is felt that the effort was worth while.

VIII-RECOMMENDATIONS

With the thought of improving the efficiency of future insect control programs it is believed that a few suggestions might be in order.

A-Agreements.

1-Form.

The form of agreement with land owners should be simplified. The present form is so long and so encumbered with legal verbiage that the real intent is obscured. As a matter of fact, few of the cooperators this year took the trouble to read the agreement, but it can be easily seen that the present form might be an obstacle to future operations. A suggested form is attached hereto.

2-Contribution.

a- Any agreement for sharing costs should be on a cash basis, and no allowance should be made for labor or stumpage. Our experience this year proved that it is impractical to try to cooperate with an owner as far as labor is concerned. A rancher has too many chores to attend to, and his available time seldom coincided with the convenience of the State, i.e., when our crew was ready to move in on a job the rancher may or may not have been available. Moreover, it is impossible for a rancher to contribute enough time to match the time put in by a 3 or 6 man State crew.

b- Any value given to stumpage, either poles or timber, is fictitious. A tree that is infested with insects to such an extent that it requires treatment has no value except for firewood, which the owner gets anyway if he wishes. It is

a loss to the owner if no control is conducted. Why should it be given a value when treated?

c- No attempt should be made to collect a 50% contribution from any owner unless he is in a position to pay it in cash. With few exceptions rancher owners should not be asked to share the cost of insect control. This should be the responsibility of the State, and of timber operators or timber owners who receive or expect to receive an income from the timber growing on their land.

d- Since estimates on the cost of insect control are very unreliable, it would be advisable to have the agreement specify the proportion of the cost to be shared and a limit to amount, rather than state the estimated contribution.

B-Operation

1- Owners should be encouraged to carry on their own control work with their own personnel. The State should cooperate with advice and possibly with spotting, but it would be desirable to have the owner do the treating.

2- Where the State must carry on control it should do all of it,- that is all personnel should be in State employ. This year spotting, for instance, could have been done at considerable less cost if it had been handled entirely by CDF personnel.

3- There are some instances where timberland is infested but where the owner for some reason does not wish to bear the cost of control, although he may well be able to do so. This infestation is a menace to surrounding areas where the owners are willing to pay their share of the cost. Some means should be provided whereby the state could enter upon such land, eradi-

cate the infestation, and assess at least part of the cost against the owner.

C-Equipment.

While some equipment was obtained for the 1946 project, there are still several items which should be acquired in order to avoid the necessity of borrowing from the Forest Service. Following is a list of articles which will be needed for the 1947 season:

1. 2 - 6x8 tatum holders
2. 2 Belt axes
3. 1 Paint gun
4. 2 Box compasses

IX- CONCLUSION

In concluding this report some comment should be made on the crew which worked on the project. The CYA crew was most satisfactory, from the point of view of both cost and performance. The CDF personnel assigned to the project worked efficiently and harmoniously. Relations with the Fruit Growers Supply Company were most pleasant. A word of appreciation is due to Ralph Hall and Jack Bongberg of the Bureau of Entomology for their advice and assistance. While there is no doubt room for improvement, it is felt that the job was well done.

A P P E N D I X

Suggested Agreement Form

Maps

Index to Tables

AGREEMENT (Suggested)

DEPARTMENT OF NATURAL RESOURCES
STATE OF CALIFORNIA
DIVISION OF FORESTRY

This agreement between the State of California and _____, landowner, is for the purpose of controlling the depredations of certain forest insects which are now infesting trees growing upon property belonging to the above named landowner, who therefore agrees to:

1. Permit employees of the Division of Forestry to enter upon his land to search for and destroy any insect infested trees which are found, in a manner approved by the State Forester.

2. To reimburse the State of California for ____% of the cost of the operation providing such reimbursement does not exceed $_____.

The State of California agrees to:

1. Take all reasonable precaution to protect the property against damage from treating operations.

2. To assume ____% of the cost of the operation.

3. To make available to the landowner, upon request, all figures pertaining to the cost of the project.

Date of Agreement _____

Date of Expiration _____

_____
For the Landowner

_____
For the State

INDEX TO TABLES

COSTS	Co-operator Contributions, Classified	XIV
	Co-operator & State Contributions, Total	XV
	Estimated Actual Costs	XVIII
	Fund, Insect Control	XIII
	Labor Cost & Distribution	IX
	Meal Cost, Total	XVI
	Meal Cost, CY.	XVII
	Operating Expense	X
	Spotting Cost	III
	State Costs, Total Net	XII
	State Expenditure, Total	XI
	Treating Cost	VII
PERFORMANCE	Acres Spotted and Treated	II
	Salvaged Timber	IV
	Spotting Performance	III
	Treating Performance	VI
	Treating Record, by ownership	V
MISCELLANEOUS	Agreements	I
	Park Maintenance Zone	VIII